

USE OF VARIETY AND SUBSPECIES AND NEW VARIETAL COMBINATIONS FOR *STYRAX* *PLATANIFOLIUS* (STYRACACEAE)

B.L. Turner

*Section of Integrative Biology
University of Texas
Austin, TX 78713, U.S.A.*

Guy L. Nesom

*North Carolina Botanical Garden
University of North Carolina
Chapel Hill, NC 27599-3280, U.S.A.*

ABSTRACT

The term "variety" has historical precedence over "subspecies" and is either prescribed or recommended by the ICBN as the rank to be first used in the description of infraspecific taxa. The rank "subspecies" is then used to cluster related varieties. Accordingly, to replace earlier combinations at subspecific rank, the following new combinations in *Styrax platanifolius* are proposed: var. **mollis** (P.W. Fritsch) B.L. Turner, comb. et stat. nov.; var. **texanus** (Cory) B.L. Turner, comb. et stat. nov.; and var. **youngiae** (Cory) B.L. Turner, comb. et stat. nov. No subspecies are recognized here in *S. platanifolius*.

RESUMEN

El término "variedad" precede históricamente al de "subespecie" y es ordenado o recomendado por el ICBN como el primer rango a ser usado en la descripción de taxa infraespecíficos. El rango "subespecie" se usa después para agrupar variedades relacionadas. De acuerdo con esto, se proponen las siguientes nuevas combinaciones para reemplazar combinaciones previas en el rango subespecífico en *Styrax platanifolius*: var. **mollis** (P.W. Fritsch) B.L. Turner, comb. et stat. nov.; var. **texanus** (Cory) B.L. Turner, comb. et stat. nov.; y var. **youngiae** (Cory) B.L. Turner, comb. et stat. nov. No se reconocen subespecies aquí en *S. platanifolius*.

Fritsch (1997) has provided a much needed revision of *Styrax* for Mesoamerica, Mexico and western Texas, recognizing 19 species. One of these, *S. platanifolius* Engelm. ex Torr., was treated as having five subspecies, bringing to 24 the number of formal taxa of *Styrax* recognized for the region concerned. Fritsch recognized infraspecific taxa as "subspecies" rather than "varieties," noting (p. 711) that his usage was "in accordance with the concepts of Hultén (1967) and Thorne (1978)," who "use the subspecies category for infraspecific taxa that are geographically as well as morphologically distinct."

Of course, most current botanists who employ "variety" also use it in reference to infraspecific taxa that are geographically and morphologically distinct, and we do not accept what is essentially the equating of these two categories of infraspecific classification. The use of variety in plant taxonomy for the first infraspecific rank dates back to Linnaeus and has historical precedence over the term subspecies. More significantly,

this usage of variety is set forth by the current International Code of Botanical Nomenclature (Greuter et al. 2000) in the same format and language as other conventions that are clearly prescriptive.

Article 4.1. "The secondary ranks of taxa in descending sequence are tribe (tribus) between family and genus, section (sectio) and series (series) between genus and species, and variety (varietas) and form (forma) below species."

Use of the "sub" prefix provides added ranks.

Article 4.2. "If a greater number of ranks of taxa is desired, the terms for these are made by adding the prefix sub- to the terms denoting the principal or secondary ranks. A plant may thus be assigned to taxa of the following ranks (in descending sequence): regnum, subregnum, divisio or phylum, subdivisio or subphylum, classis, subclassis, ordo, subordo, familia, subfamilia, tribus, subtribus, genus, subgenus, sectio, subsectio, series, subseries, species, subspecies, varietas, subvarietas, forma, subforma."

Philosophical and interpretive differences regarding use of infra-taxon categories are magnified by this tension in the ICBN: **variety and/or forma are the ranks to be used first in describing infraspecific taxa (Article 4.1), but subspecies is the term first in hierarchical rank below species (Article 4.2).** Use of *species* and *variety*, however, is analogous to that for general use of *kingdom* and *division*, *class* and *order*, *family* and *tribe*, and *genus* and *section*. In each of these pairs the first used sub-rank (the second term) is code-prescribed as such (4.1), with the orthographically subsidiary and immediately hierarchical ranks *subkingdom*, *subclass*, *subfamily*, and *subgenus* generally used for an additional rank (4.2), as is *subspecies*.

Varieties may be clustered by use of the subspecies category

Varieties are recognized within a species when it is desirable to refer by name to morpho-geographically differentiated entities comprising that species. In our concept and experience, varieties usually are closely similar allopatric entities that intergrade over a relatively short distance in regions of contact (as opposed to gradual, broadly regional intergradation), if they intergrade at all. In addition to morphology and geography, other factors may be used in evaluation of taxonomic status of such entities—genetic divergence, likelihood of natural hybridization, and fertility of hybrids (Stuessy 1990).

In a species where several varieties are recognized, two or more varieties may be grouped within a subspecies. In this sense, use of the subspecies rank may point to larger patterns of variation and/or coherence within the species. This use of infraspecific categories finds support in the ICBN, which implies that the term subspecies is used for clustering varieties.

Recommendation 26A.2. "A subspecies not including the type of the correct name of the species should, where there is no obstacle under the rules, be given a name with the same final epithet and type as a name of one of its subordinate varieties."

Use of the subspecies rank in clustering varieties is not pervasive, but it is currently found across various families and genera in the North American flora (e.g., *Agastache*, *Arenaria*, *Arnica*, *Artemisia*, *Cerastium*, *Chamaecrista*, *Chrysothamnus*, *Ericameria*, *Erigeron*,

Eriogonum, *Heterotheca*, *Ipomopsis*, *Lathyrus*, *Lupinus*, *Machaeranthera*, *Monarda*, *Prunus*, *Ptelea*, *Ruellia*, *Salix*, *Salvia*, *Scutellaria*, *Sidalcea*, *Silene*, *Solidago*, *Streptanthus*, *Symphyotrichum*, and *Tetramolopium*).

Other perspectives on the use of infraspecific categories

The issue of “variety vs. subspecies” in infraspecific classification has been discussed repeatedly. Cronquist (1988) and Stuessy (1990) gave detailed overviews of the issue and Hamilton and Reichard (1992) provided a review of current practice in the use of infraspecific categories. Our commentary does not break new ground, but it emphasizes primary considerations and it is a reminder that usage of these categories remains inconsistent and commonly without explicit rationale.

Views similar to ours have been well-expressed by Kapadia (1963) and Holmgren (1994). In a contrasting view, Raven (1974) proposed to simplify infraspecific terminology by using only the term subspecies, nomenclaturally equating the term variety, this proposal accompanied by detailed suggestions for its formalization in the ICBN. Another form of this latter solution is to use subspecies as the first category for infraspecific taxa—then to use varieties (at lower rank) for subsequent subdivisions of subspecies (see Stuessy 1990, Fig. 12.1). For Thorne (1978, p. 190), “Genetic variants without well-defined geographic ranges are treated as varieties ...” Such proposals, however, to formally displace “variety” as the first infraspecific category have not been accepted, presumably because many botanists find utility in maintaining two classificatory units at infraspecific rank and because the basis for use of “variety” is historical and currently codified.

The rank of variety has been used to describe taxa over a range of evolutionary and morphological differentiation. Some taxa are more strongly differentiated than others. Traditional views of boundaries between taxa at specific and infraspecific rank also differ among genera and families. Replacing variety with subspecies would not change this.

The International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature 1999) does not provide for the term “variety” for classificatory purposes. The latter term, as used by most botanical taxonomists and as prescribed by the ICBN, is essentially equivalent to the subspecies rank of zoologists. This is acceptable. The botanical code is for plant workers, the zoological code for animal workers and the two codes need not become one. Actually, it is informative to see the term “variety” in a title or abstract: one knows that the organisms concerned are most likely plants.

It might be argued that the term “variety” has been misapplied by various workers, especially horticulturists and plant breeders, to designate mere forms. But most professional plant taxonomists use the term “forma” for such population variants, while the International Code of Nomenclature for Cultivated Plants (Trehane et al. 1995) refers to such an individual plant or genetic strain as a “cultivar” (cultivated variety). The horticultural taxonomists coordinate their taxonomy with the ICBN, providing an adjunct system, not one that contradicts (Brickell & Trehane 1997). In short, horticultural usage is not a tenable rationale for generally adopting the rank of subspecies to the exclusion of variety.

In contrast to these more pragmatic arguments for using variety as first choice of infraspecific rank, guidance of the ICBN is more ambiguous. Is the nomenclatural convention codified in Article 4.1 a prescription, or is it merely a suggestion or recommendation? In either case, what is its relationship to Article 4.2? And what bearing, if any, does Article 5.1 have on this interpretation?

Article 5.1. "The relative order of the ranks specified in Art. 3 and 4 must not be altered (see Art. 33.7 and 33.8)."

Articles 4 and 5 are not included among those whose conditions must be met for valid publication, according to Article 32. But, then, how should they be interpreted? What bearing, if any, does Article 2.1 have on this interpretation?

Article 2.1. "Every individual plant is treated as belonging to an indefinite number of taxa of consecutively subordinate rank, among which the rank of species (species) is basic."

Intraspecific taxa in *Styrax platanifolius*

Evidence from morphology and isozyme analysis indicates that only a single species should be recognized among the populations of *Styrax* in west Texas and adjacent Mexico—*S. platanifolius*, a morphologically and geographically distinct taxon, apparently most closely related to the California endemic *S. redivivus* (Torr.) Wheeler (Fritsch 1997). While variation in pubescence quantity in other New World *Styrax* species is essentially random, Fritsch (1997, p. 741) found that "trichome morphology or abundance within *S. platanifolius* is distinctly regional and facilitates the delimitation of nearly or completely allopatric taxa. Therefore, I have recognized five subspecies within *S. platanifolius* based on minor but distinctive differences. Trichome characters are those most reliable for the delimitation of these subspecies; characters of secondary importance include leaf form, calyx gland density, and surface features of the stem," characters considered by Fritsch "not taxonomically reliable" or "taxonomically inconsequential" within many other species of the genus.

Three of the *Styrax platanifolius* subspecies (*platanifolius*, *stellatus*, *texanus*) form a relatively compact geographic cluster on the Edwards Plateau of Texas; the other two (*youngiae* and *mollis*) are longitudinally aligned in sierran localities from trans-Pecos Texas into northeastern Mexico. Fritsch did not mention any aspect of intergradation among these taxa—while it apparently is true that the distinctions are fairly discrete, the populations are rare, composed of very few individuals, and each population can be seen as completely isolated within the rugged terrain. Fritsch's comment (p. 743) that "subspecies *stellatus* resembles subspecies *mollis* more closely than does subspecies *youngiae*" might suggest that [subsp.] *stellatus* and *mollis* could be considered together as a larger infraspecific unit, but the geographic disjunction between these two would render this a peculiar concept.

In sum, the morphological and evolutionary status of infraspecific taxa of *Styrax platanifolius* (sensu Fritsch 1997) corresponds to what we conceive of here as varieties. Varietal rank is generally used as the first infraspecific taxonomic category throughout

the Texas flora, especially in the developing "Atlas of the Flora of Texas" (Turner in prep.). In this context, the following varietal combinations in *S. platanifolius* (a, d, e) are proposed in order to provide for their use in matters systematic.

a. *Styrax platanifolius* var. *mollis* (P.W. Fritsch) B.L. Turner, comb. et stat. nov. BASIONYM: *Styrax platanifolius* subsp. *mollis* P.W. Fritsch, Ann. Missouri Bot. Gard. 84:742. 1997.

b. *Styrax platanifolius* Engelm. ex Torrey var. *platanifolius*. Automatically established with the publication of Cory's var. *stellatus*, as listed below.

Styrax platanifolius subsp. *platanifolius*. Automatically established by Fritsch's subspecies, as listed below.

c. *Styrax platanifolius* var. *stellatus* Cory, Madroño 7:111. 1943.

Styrax platanifolius subsp. *stellatus* (Cory) P.W. Fritsch, Ann. Missouri Bot. Gard. 84:743. 1997.

d. *Styrax platanifolius* var. *texanus* (Cory) B.L. Turner, comb. et stat. nov. BASIONYM: *Styrax texanus* Cory, Madroño 7:112. 1943.

Styrax platanifolius subsp. *texanus* (Cory) P.W. Fritsch, Ann. Missouri Bot. Gard. 84:744. 1997.

e. *Styrax platanifolius* var. *youngiae* (Cory) B.L. Turner, comb. et stat. nov. BASIONYM: *Styrax youngiae* Cory, Madroño 7:113. 1943.

Styrax platanifolius subsp. *youngiae* (Cory) P.W. Fritsch, Ann. Missouri Bot. Gard. 84:744. 1997.

ACKNOWLEDGMENTS

We are grateful to Peter Fritsch for comments on an early draft of the manuscript, to John Strother for perspectives on terminology and parsimony, and to Rogers McVaugh for a discussion of the issues involved.

REFERENCES

- BRICKELL, C. and P. TREHANE. 1997. The RHS Advisory Panel on nomenclature and taxonomy. *New Plantsman* 4:115–119. Also <http://www.rhs.org.uk/science/mn_APONAT1.asp>; accessed October 2000.
- CRONQUIST, A. 1988. The evolution and classification of flowering plants. Ed. 2. New York Botanical Garden, New York.
- FRITSCH, P.W. 1997. A revision of *Styrax* (Styracaceae) for western Texas, Mexico, and Mesoamerica. Ann. Missouri Bot. Gard. 84:705–761.
- GREUTER, W., F.R. BARRIE, H.M. BURDET, W.G. CHALONER, V. DEMOULIN, D.L. HAWKSWORTH, P.M. JØRGENSEN, D.H. NICOLSON, P.C. SILVA, P. TREHANE, and J. McNEILL (eds.). 2000. International code of botanical nomenclature (Saint Louis Code). Koeltz Scientific Books, Königstein, Germany.

- HAMILTON, C.W. and S.H. REICHARD. 1992. Current practice in the use of subspecies, variety, and forma in the classification of wild plants. *Taxon* 41:485–498.
- HOLMGREN, N.H. 1994. Redefinition of *Dodecatheon dentatum* (Primulaceae) and rationale for use of varietal rank. *Brittonia* 46:87–94.
- HULTEN, E. 1967. Comments on the flora of Alaska and Yukon. *Ark. Bot.*, n.s. 7:1–147.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 1999. International code of zoological nomenclature (ed. 4). International Trust for Zoological Nomenclature, London, U.K.
- KAPADIA, Z.J. 1963. Varieties and subspecies: A suggestion towards greater uniformity. *Taxon* 12:257–258.
- RAVEN, P.H. 1974. Proposal for the simplification of infraspecific terminology. *Taxon* 23: 828–831.
- STUESSY, T.F. 1990. Plant taxonomy: The systematic evaluation of comparative data. Columbia Univ. Press, NY.
- THORNE, R.F. 1978. New subspecific combinations for southern California plants. *Aliso* 9:189–196.
- TREHANE, P., C.D. BRICKELL, B.R. BAUM, W.L.A. HETTERSCHIED, A.C. LESLIE, J. MCNEILL, S.A. SPONGBERG, and F. VRUGTMAN, eds. 1995. The international code of nomenclature for cultivated plants (ed. 6). Quarterjack Publishing, Wimborne, UK.